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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Lewis R. Dove, et al.

Serial No.: 10/783,465

Examiner: Benny T. Lee

Filing Date: February 20, 2004

Group Art Unit: 2817

Title: METHODS AND APPARATUS FOR COUPLING FIRST AND SECOND MICROWAVE MODULES

COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Sir:

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on April 4, 2006.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) **\$500.00**.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)(1)-(5)) for the total number of months checked below:

<input type="checkbox"/>	one month	\$ 120.00
<input type="checkbox"/>	two months	\$ 450.00
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<input type="checkbox"/>	four months	\$1590.00

☐ The extension fee has already been filled in this application.

☒ (b) Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account **50-1078** the sum of **\$500.00**. At any time during the pendency of this application, please charge any fees required or credit any overpayment to Deposit Account **50-1078** pursuant to 37 CFR 1.25.

A duplicate copy of this transmittal letter is enclosed.

Respectfully submitted,

Lewis R. Dove, et al.

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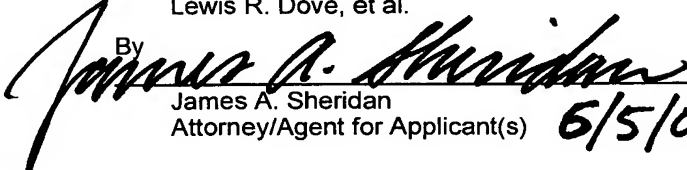
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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Appl. No. : 10/783,465 Confirmation No. 7444
Appellant : Lewis R. Dove et al.
Filed : February 20, 2004
TC/A.U. : 2817
Examiner : Benny T. Lee

Docket No. : 10020706-1

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Appl. No.	:	10/783,465	Confirmation No. 7444
Appellant	:	Lewis R. Dove et al.	
Filed	:	February 20, 2004	
TC/A.U.	:	2817	
Examiner	:	Benny T. Lee	
Docket No.	:	10020706-1	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

This Appeal Brief is submitted in response to the Final Office Action mailed January 4, 2006, and the Examiner's Advisory Action mailed March 27, 2006.

Appellant filed a Notice of Appeal on April 4, 2006.

Real Party in Interest

The real party in interest is Agilent Technologies, Inc., assignee of the above captioned patent application. Agilent Technologies, Inc. is a Delaware Corporation having its principal place of business in Palo Alto, California.

Related Appeals and Interferences

There are no related appeals and/or interferences.

Status of Claims

Claims 1-25 are pending in this application. Claims 1-25 currently stand rejected. The rejections of claims 1-25 are appealed.

A copy of the claims is attached as a Claims Appendix to this Appeal Brief.

Status of Amendments

An amendment after the final office action was filed on March 6, 2006. In the Advisory Action mailed on March 27, 2006, the Examiner indicated that the proposed amendments will be entered upon the timely submission of a Notice of Appeal and Appeal brief with requisite fees.

Summary of Claimed Subject Matter

The invention is variously embodied. Four embodiments are summarized below.

In one embodiment, there is disclosed a microwave circuit, comprising first and second microwave modules (FIG. 3; 300, 302; p. 6, lines 23-24), each of which comprises a conductor (FIG. 3; 312, 314; p. 7, lines 2-4) sandwiched between upper and lower thickfilm dielectrics (FIG. 3; 322, 324; p. 7, line 9), and a ground shield (FIG. 3; 318, 320; p. 7, lines 2-4) surrounding the upper and lower thickfilm dielectrics (FIG. 3; 322, 324; p. 7, line 9) in a direction transverse to the conductor (FIG. 3; 312, 314; p. 7, lines 2-4); wherein, at a first end of each of the conductors (FIG. 3; 312, 314; p. 7, lines 2-4), the conductor (FIG. 3; 312, 314; p. 7, lines 2-4) extends from beneath a respective upper thickfilm dielectric (FIG. 3; 322, 324; p. 7, line 9) to terminate at a cut edge (FIG. 3; 306, 308; p. 6, line 25 –p. 7, line 3) of a corresponding microwave module (FIG. 3; 300, 302; p. 6, lines 23-24); the microwave modules (FIG. 3; 300, 302; p. 6, lines 23-24) being mounted with said cut edges (FIG. 3; 306, 308; p. 6, line 25 –p. 7, line 3) facing one another; a bridge conductor (FIG. 3; 310; p. 7, lines 2-4), electrically coupling the first ends of the conductors (FIG. 3; 312, 314; p. 7, lines 2-4); and a ground shield cap (FIG. 3; 316; p. 7, lines 7-8), oriented over the bridge conductor (FIG. 3; 310; p. 7, lines 2-4) and electrically coupled to the ground shield (FIG. 3; 318, 320; p. 7, lines 2-4) surrounding the upper and lower thickfilm dielectrics (FIG. 3; 322, 324; p. 7, line 9) of each of the microwave modules (FIG. 3; 300, 302; p. 6, lines 23-24).

In a second embodiment, there is disclosed a microwave circuit, comprising first and second microwave modules (FIG. 3; 300, 302; p. 6, lines 23-24), each comprising: i) a substrate (FIG. 3; 304, 302; p. 6, line 24), ii) a first ground shield formed on the substrate (FIG. 3; 318, 320; p. 7, lines 2-4), iii) a first dielectric (FIG. 3; 322; p. 7, line 9) formed on the first ground shield (FIG. 3; 318; p. 7, lines 2-4), iv) a conductor (FIG. 3; 312; p. 7, lines 2-4) formed on the first

dielectric (FIG. 3; 322; p. 7, line 9), v) a second dielectric (FIG. 3; 324; p. 7, line 9) formed on the conductor (FIG. 3; 312; p. 7, lines 2-4), and vi) a second ground shield (FIG. 3; 320; p. 7, lines 2-4) formed on the second dielectric (FIG. 3; 324; p. 7, line 9); wherein, for each microwave module (FIG. 3; 300, 302; p. 6, lines 23-24), at least the second dielectric (FIG. 3; 324; p. 7, line 9) and second ground shield (FIG. 3; 320; p. 7, lines 2-4) are recessed from an end of the conductor (FIG. 3; 312; p. 7, lines 2-4) terminating at or near a cut edge (FIG. 3; 306; p. 6, line 25 – p. 7, line 3) of the corresponding microwave module (FIG. 3; 300; p. 6, lines 23-24); wherein, for each microwave module (FIG. 3; 300, 302; p. 6, lines 23-24), the first ground shield (FIG. 3; 318; p. 7, lines 2-4) and the second ground shield (FIG. 3; 320; p. 7, lines 2-4) contact one another to surround the first dielectric (FIG. 3; 322; p. 7, line 9) and the second dielectric (FIG. 3; 324; p. 7, line 9) in a direction transverse to the conductor (FIG. 3; 312; p. 7, lines 2-4); the microwave modules (FIG. 3; 300, 302; p. 6, lines 23-24) being mounted with said cut edges (FIG. 3; 306, 308; p. 6, line 25 – p. 7, line 3) facing one another; a bridge conductor (FIG. 3; 310; p. 7, lines 2-4), electrically coupling said ends of the conductors (FIG. 3; 312, 314; p. 7, lines 2-4) of the microwave modules (FIG. 3; 300, 302; p. 6, lines 23-24); and a ground shield cap (FIG. 3; 316; p. 7, lines 7-8), oriented over the bridge conductor (FIG. 3; 310; p. 7, lines 2-4) and electrically coupled to the second ground shield (FIG. 3; 320; p. 7, lines 2-4) of each of the microwave modules (FIG. 3; 300, 302; p. 6, lines 23-24).

In a third embodiment, a method (FIG. 4; 400; p. 7, lines 17-19) for coupling first and second microwave modules is disclosed, wherein each microwave module comprises i) a substrate, ii) a first ground shield formed on the substrate, iii) a first dielectric formed on the first ground shield, iv) a conductor formed on the first dielectric, v) a second dielectric formed on the conductor, and vi) a second ground shield formed on the second dielectric; and wherein, for each microwave module, at least the second dielectric and second ground shield are recessed from a first end of the conductor; wherein, for each microwave module, the first ground shield and the second ground shield contact one another to surround the first dielectric and the second dielectric in a direction

transverse to the conductor; the method comprising for each of the microwave modules, cutting (FIG. 4; 402; p. 7, lines 19-21) the microwave module in proximity to the first end of the conductor, thereby defining a first edge of the corresponding microwave module; mounting (FIG. 4; 404; p. 7, lines 21-23) the microwave modules adjacent one another, with their first edges facing each other; electrically coupling (FIG. 4; 406; p. 7, lines 23-24) said first ends of the conductors of the microwave modules; and placing (FIG. 4; 408; p. 7, line 24 – p. 8, line 1) a ground shield cap over the conductor coupling, and electrically coupling the ground shield cap to the second ground shield of each of the microwave modules.

In a fourth embodiment, a method (FIG. 5; 500; p. 8, lines 2-4) is disclosed, comprising: selecting (FIG. 5; 502; p. 8, lines 4-5) first and second microwave modules, each comprising i) a substrate, ii) a first ground shield formed on the substrate, iii) a first dielectric formed on the first ground shield, iv) a conductor formed on the first dielectric, v) a second dielectric formed on the conductor, and vi) a second ground shield formed on the second dielectric; wherein, for each microwave module, at least the second dielectric and second ground shield are recessed from an end of the conductor terminating at or near a cut edge of the microwave module; wherein, for each microwave module, the first ground shield and the second ground shield contact one another to surround the first dielectric and the second dielectric in a direction transverse to the conductor; mounting (FIG. 5; 504; p. 8, lines 6-7) the microwave modules adjacent one another, with said cut edge of the first microwave module facing said cut edge of the second microwave module; electrically coupling (FIG. 5; 506; p. 8, lines 6-7) said ends of the conductors of the microwave modules; and placing (FIG. 5; 508; p. 8, lines 8-9) a ground shield cap over the conductor coupling, and electrically coupling the ground shield cap to the second ground shield of each of the microwave modules.

Grounds of rejection to be reviewed on appeal

1. Whether claims 1-8 and 22 should be rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
2. Whether claims 1, 9, 10, 16 and 22-25 should be rejected under 35 U.S.C. 103(a) as being unpatentable over by Ishihara (Japanese Patent No. 92102; hereinafter "Ishihara") in view of Arledge et al. (U.S. Patent No. 6,000,120; hereinafter "Arledge").
3. Whether 2, 4, 11, 13, 17 and 19 should be rejected under 35 U.S.C. 103(a) as being unpatentable over the rejection identified in Item 4 above as applied to claims 1, 10 and 16, and further in view of Cox et al. (U.S. Patent No. 6,100,774; hereinafter "Cox").
4. Whether claims 3, 12 and 18 should be rejected under 35 U.S.C. 103(a) as being unpatentable over the rejection identified in Item 4 above as applied to claims 10 and 16, and further in view of Drapeau et al. (U.S. Patent No. 6,307,446; hereinafter "Drapeau").
5. Whether claims 5-8, 14, 15, 20 and 21 should be rejected under 35 U.S.C. 103(a) as being unpatentable over the rejection identified in Item 4 above as applied to claims 10 and 16, and further in view of Dove et al. (U.S. Patent No. 6,457,979; hereinafter "Dove").

Argument

1. Whether claims 1-8 and 22 should be rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1

On page 2 of the Final Office Action of January 4, 2006, the Examiner states “[i]n claim 1, note that it is unclear if ‘a ground shield’ is properly characterized as being ‘in a direction transverse to the conductor’ and still surround the dielectric layers. From the disclosure, it appears that portions of the ground shield are also parallel to the conductor. Clarification is needed.”

Appellants respectfully assert that the limitation of “a ground shield surrounding the upper and lower thickfilm dielectrics in a direction transverse to the conductor” is clear. This limitation is in contrast to a pair of ground shields that include sheets in a parallel configuration to one another that do not surround a conductor in a direction transverse thereto. Claim 1 is believed allowable.

Claims 2-8 and 22

Claims 2-8 and 22 each depend directly from independent claim 1, and are believed to be in condition for at least the above-identified reason.

2. Whether claims 1, 9, 10, 16 and 22-25 should be rejected under 35 U.S.C. 103(a) as being unpatentable over by Ishihara (Japanese Patent No. 92102; hereinafter "Ishihara") in view of Arledge et al. (U.S. Patent No. 6,000,120; hereinafter "Arledge").

Claim 1 calls for *a microwave circuit comprising first and second microwave modules*, each of which comprises a conductor sandwiched between upper and lower thickfilm dielectrics, and *a ground shield surrounding the upper and lower thickfilm dielectrics in a direction transverse to the conductor*, wherein, at a first end of each of the conductors, the conductor extends from beneath the respective upper thickfilm dielectric to terminate at a cut edge of the corresponding microwave module; the microwave modules being mounted with said cut edges facing one another; a bridge conductor, electrically coupling the first ends of the conductors; and *a ground shield cap*, oriented over the bridge conductor and *electrically coupled to the ground shield surrounding the upper and lower thickfilm dielectrics of each of the microwave modules*. (Emphasis added.)

Appellants believe Ishihara discloses layers of metallization on dielectric layers; however, the layers of metallization do not surround the center conductor as the sides of the layers metallization are unconnected. Appellants assert Ishihara provides no suggestion or motivation for a microwave circuit having a ground shield surrounding the upper and lower thickfilm dielectrics in a direction transverse to the conductor. Furthermore, Ishihara provides no suggestion or motivation for a microwave circuit having a ground shield cap, oriented over a bridge conductor and electrically coupled to the ground shield surrounding the upper and lower thickfilm dielectrics of each of the microwave modules.

Appellants believe Arledge discloses a coaxial transmission line on a high density PCB. The coaxial transmission line has a center conductor which is surrounded in a direction transverse thereto by a dielectric material, which in turn is surrounded in a direction transverse thereto by a ground shield. Appellants assert Arledge provides no suggestion or motivation for a conductor that extends

from beneath its upper thickfilm dielectric to terminate at a cut edge of its microwave module. Furthermore, Arledge provides no suggestion or motivation for microwave modules being mounted with cut edges facing one another. Arledge provides no suggestion or motivation for a bridge conductor or a ground shield cap.

Appellants believe neither Ishihara nor Arledge teach or suggest a ***microwave circuit having first and second microwave modules***, each of which comprises a conductor sandwiched between upper and lower thickfilm dielectrics, and a ***ground shield surrounding the upper and lower thickfilm dielectrics in a direction transverse to the conductor***, wherein, at a first end of each of the conductors, the conductor extends from beneath its upper thickfilm dielectric to terminate at a cut edge of its microwave module; and a ***ground shield cap***, oriented over the bridge conductor and ***electrically coupled to the ground shield surrounding the upper and lower thickfilm dielectrics of each of the microwave modules***. Appellants assert neither Ishihara nor Arledge provide any suggestion or motivation to one of ordinary skill in the art, without relying on a hindsight, to select the above-identified claimed features. Accordingly, claim 1 is believed allowable.

Claim 22

Claim 22 depends directly from independent claim 1, and is believed to be allowable for at least the above-identified reasons.

Claim 9

Claim 9 calls for a ***microwave circuit comprising first and second microwave modules***, each comprising: i) a substrate, ii) a first ground shield formed on the substrate, iii) a first dielectric formed on the first ground shield, iv)

a conductor formed on the first dielectric, v) a second dielectric formed on the conductor, and vi) a second ground shield formed on the second dielectric; wherein, for each microwave module, at least the second dielectric and second ground shield are recessed from an end of the conductor terminating at or near a cut edge of the corresponding microwave module; wherein, for each microwave module, ***the first ground shield and the second ground shield contact one another to surround the first dielectric and the second dielectric in a direction transverse to the conductor; the microwave modules being mounted with said cut edges facing one another***, a bridge conductor, electrically coupling said ends of the conductors of the microwave modules; and ***a ground shield cap, oriented over the bridge conductor and electrically coupled to the second ground shield of each of the microwave modules.*** (Emphasis added.)

Appellants believe Ishihara discloses layers of metallization on dielectric layers; however, the layers of metallization do not surround the center conductor as the sides of the layers metallization are unconnected. Appellants assert Ishihara provides no suggestion or motivation for a microwave circuit with a first ground shield and a second ground shield that contact one another to surround the first dielectric and the second dielectric in a direction transverse to the conductor. Furthermore, Ishihara provides no suggestion or motivation for a microwave circuit having a ground shield cap, oriented over a bridge conductor and electrically coupled to the ground shield surrounding the upper and lower thickfilm dielectrics of each of the microwave modules.

Appellants believe Arledge discloses a coaxial transmission line on a high density PCB. The coaxial transmission line has a center conductor which is surrounded in a direction transverse thereto by a dielectric material, which in turn is surrounded in a direction transverse thereto by a ground shield. Appellants assert Arledge provides no suggestion or motivation for at least the second dielectric and second ground shield being recessed from an end of the conductor terminating at or near a cut edge of the corresponding microwave module. Furthermore, Arledge provides no suggestion or motivation for microwave

modules being mounted with cut edges facing one another. Arledge provides no suggestion or motivation for a bridge conductor or a ground shield cap.

Appellants believe neither Ishihara nor Arledge teach or suggest **a microwave circuit comprising first and second microwave modules**, each comprising: i) a substrate, ii) a first ground shield formed on the substrate, iii) a first dielectric formed on the first ground shield, iv) a conductor formed on the first dielectric, v) a second dielectric formed on the conductor, and vi) a second ground shield formed on the second dielectric; wherein, for each microwave module, at least the second dielectric and second ground shield are recessed from an end of the conductor terminating at or near a cut edge of the corresponding microwave module; wherein, for each microwave module, **the first ground shield and the second ground shield contact one another to surround the first dielectric and the second dielectric in a direction transverse to the conductor; the microwave modules being mounted with said cut edges facing one another**; a bridge conductor, electrically coupling said ends of the conductors of the microwave modules; and **a ground shield cap, oriented over the bridge conductor and electrically coupled to the second ground shield of each of the microwave modules**. Appellants assert neither Ishihara nor Arledge provide any suggestion or motivation to one of ordinary skill in the art, without relying on a hindsight, to select the above-identified claimed features. Accordingly, claim 9 is believed to be allowable

Claim 23

Claim 23 depends directly from independent claim 9, and is believed to be allowable for at least the above-identified reasons.

Claim 10

Claim 10 calls for **a method for coupling first and second microwave modules**, wherein each microwave module comprises: i) a substrate, ii) a first ground shield formed on the substrate, iii) a first dielectric formed on the first ground shield, iv) a conductor formed on the first dielectric, v) a second dielectric formed on the conductor, and vi) a second ground shield formed on the second dielectric; and wherein, for each microwave module, at least the second dielectric and second ground shield are recessed from a first end of the conductor; wherein, for each microwave module, **the first ground shield and the second ground shield contact one another to surround the first dielectric and the second dielectric in a direction transverse to the conductor**, the method comprising: for each of the microwave modules, cutting the microwave module in proximity to the first end of the conductor, thereby defining a first edge of the corresponding microwave module; mounting the microwave modules adjacent one another, with their first edges facing each other; electrically coupling said first ends of the conductors of the microwave modules; and **placing a ground shield cap over the conductor coupling, and electrically coupling the ground shield cap to the second ground shield of each of the microwave modules**. (Emphasis added.)

Appellants believe Ishihara discloses a method of connecting triplate lines by exposing a conductor through breaking off a part of the dielectric of a conductor and inserting a conductor into the notched part. Appellants assert Ishihara provides no suggestion or motivation for a method of coupling first and second microwave modules in which each microwave module has a first ground shield and a second ground shield that contact one another to surround the first dielectric and the second dielectric in a direction transverse to the conductor. Furthermore, Ishihara provides no suggestion or motivation for a method of coupling first and second microwave modules that includes a step of placing a ground shield cap over the conductor coupling, and electrically coupling the

ground shield cap to the second ground shield of each of the microwave modules.

Appellants believe Arledge discloses a method of forming a coaxial transmission line on a high density PCB. The coaxial transmission line has a center conductor which is surrounded in a direction transverse thereto by a dielectric material, which in turn is surrounded in a direction transverse thereto by a ground shield. Appellants assert Arledge provides no suggestion or motivation for coupling first and second microwave modules by cutting each microwave module in proximity to the first end of the conductor. Furthermore, Arledge provides no suggestion or motivation for electrically coupling said first ends of the conductors of the microwave modules. Arledge provides no suggestion or motivation for placing a ground shield cap over a conductor coupling, and electrically coupling the ground shield cap to a second ground shield of each of the microwave modules.

Appellants believe neither Ishihara nor Arledge teach or suggest **a microwave circuit having first and second microwave modules**, each of which comprises a conductor sandwiched between upper and lower thickfilm dielectrics, and **a ground shield surrounding the upper and lower thickfilm dielectrics in a direction transverse to the conductor**, wherein, at a first end of each of the conductors, the conductor extends from beneath its upper thickfilm dielectric to terminate at a cut edge of its microwave module; and **a ground shield cap**, oriented over the bridge conductor and **electrically coupled to the ground shield surrounding the upper and lower thickfilm dielectrics of each of the microwave modules**. Appellants assert neither Ishihara nor Arledge provide any suggestion or motivation to one of ordinary skill in the art, without relying on a hindsight, to select the above-identified claimed features. Accordingly, claim 10 is believed to be allowable.

Claim 24

Claim 24 depends directly from independent claim 10, and is believed to be allowable for at least the above-identified reasons.

Claim 16

Claim 16 calls for ***a method comprising selecting first and second microwave modules***, each comprising: i) a substrate, ii) a first ground shield formed on the substrate, iii) a first dielectric formed on the first ground shield, iv) a conductor formed on the first dielectric, v) a second dielectric formed on the conductor, and vi) a second ground shield formed on the second dielectric; wherein, for each microwave module, at least the second dielectric and second ground shield are recessed from an end of the conductor terminating at or near a cut edge of the microwave module; wherein, for each microwave module, ***the first ground shield and the second ground shield contact one another to surround the first dielectric and the second dielectric in a direction transverse to the conductor***, mounting the microwave modules adjacent one another, with said cut edge of the first microwave module facing said cut edge of the second microwave module; electrically coupling said ends of the conductors of the microwave modules; and ***placing a ground shield cap over the conductor coupling, and electrically coupling the ground shield cap to the second ground shield of each of the microwave modules***. (Emphasis added.)

Appellants believe Ishihara discloses a method of connecting triplate lines by exposing a conductor through breaking off a part of the dielectric of a conductor and inserting a conductor into the notched part. Appellants assert Ishihara provides no suggestion or motivation for selecting first and second microwave modules in which each microwave module has a first ground shield and a second ground shield contact one another to surround the first dielectric

and the second dielectric in a direction transverse to the conductor.

Furthermore, Ishihara provides no suggestion or motivation for placing a ground shield cap over the conductor coupling, and electrically coupling the ground shield cap to the second ground shield of each of the microwave modules.

Appellants believe Arledge discloses a method of forming a coaxial transmission line on a high density PCB. The coaxial transmission line has a center conductor which is surrounded in a direction transverse thereto by a dielectric material, which in turn is surrounded in a direction transverse thereto by a ground shield. Appellants assert Arledge provides no suggestion or motivation for selecting first and second microwave modules in which at least the second dielectric and second ground shield are recessed from an end of the conductor terminating at or near a cut edge of the microwave module. Furthermore, Arledge provides no suggestion or motivation for electrically coupling ends of the conductors of microwave modules. Arledge provides no suggestion or motivation for placing a ground shield cap over a conductor coupling, and electrically coupling the ground shield cap to a second ground shield of each of the microwave modules.

Appellants believe neither Ishihara nor Arledge teach or suggest **a microwave circuit having first and second microwave modules**, each of which comprises a conductor sandwiched between upper and lower thickfilm dielectrics, and **a ground shield surrounding the upper and lower thickfilm dielectrics in a direction transverse to the conductor**, wherein, at a first end of each of the conductors, the conductor extends from beneath its upper thickfilm dielectric to terminate at a cut edge of its microwave module; and **a ground shield cap**, oriented over the bridge conductor and **electrically coupled to the ground shield surrounding the upper and lower thickfilm dielectrics of each of the microwave modules**. Appellants assert neither Ishihara nor Arledge provide any suggestion or motivation to one of ordinary skill in the art, without relying on a hindsight, to select the above-identified claimed features. Accordingly, claim 16 is believed to be allowable.

Claim 25

Claim 25 depends directly from independent claim 16, and is believed to be allowable for at least the above-identified reasons.

3. Whether 2, 4, 11, 13, 17 and 19 should be rejected under 35 U.S.C. 103(a) as being unpatentable over the rejection identified in Item 4 above as applied to claims 1, 10 and 16, and further in view of Cox et al. (U.S. Patent No. 6,100,774; hereinafter "Cox").

Claim 2 and 4

Appellants believe Cox discloses a wire or ribbon bond connection between a microstrip line and a modified square-ax transmission line.

Appellants believe neither Ishihara nor Arledge nor Cox disclose or suggest **a microwave circuit having first and second microwave modules**, each of which comprises a conductor sandwiched between upper and lower thickfilm dielectrics, and **a ground shield surrounding the upper and lower thickfilm dielectrics in a direction transverse to the conductor**, wherein, at a first end of each of the conductors, the conductor extends from beneath its upper thickfilm dielectric to terminate at a cut edge of its microwave module; and **a ground shield cap**, oriented over the bridge conductor and **electrically coupled to the ground shield surrounding the upper and lower thickfilm dielectrics of each of the microwave modules**. Appellants assert neither Ishihara nor Arledge nor Cox provides any suggestion or motivation to one of ordinary skill in the art, without relying on hindsight, to select the above-identified features of independent claim 1. Claims 2 and 4 depend directly from independent claim 1, and are believed allowable for at least the above-identified reasons.

Claims 11 and 13

Appellants believe neither Ishihara nor Arledge nor Cox disclose or suggest **a method for coupling first and second microwave modules**, wherein each microwave module comprises: i) a substrate, ii) a first ground shield formed on the substrate, iii) a first dielectric formed on the first ground shield, iv) a conductor formed on the first dielectric, v) a second dielectric formed on the conductor, and vi) a second ground shield formed on the second dielectric; and wherein, for each microwave module, at least the second dielectric and second ground shield are recessed from a first end of the conductor; wherein, for each microwave module, **the first ground shield and the second ground shield contact one another to surround the first dielectric and the second dielectric in a direction transverse to the conductor**, the method comprising: for each of the microwave modules, cutting the microwave module in proximity to the first end of the conductor, thereby defining a first edge of the corresponding microwave module; mounting the microwave modules adjacent one another, with their first edges facing each other; electrically coupling said first ends of the conductors of the microwave modules; and **placing a ground shield cap over the conductor coupling, and electrically coupling the ground shield cap to the second ground shield of each of the microwave modules**. Appellants assert neither Ishihara nor Arledge nor Cox provides any suggestion or motivation to one of ordinary skill in the art, without relying on hindsight, to select the above-identified features of independent claim 10. Claims 11 and 13 depend directly from independent claim 10, and are believed to be allowable for at least the above-identified reasons.

Claims 17 and 19

Appellants believe neither Ishihara nor Arledge nor Cox disclose or suggest **a method comprising selecting first and second microwave**

modules, each comprising: i) a substrate, ii) a first ground shield formed on the substrate, iii) a first dielectric formed on the first ground shield, iv) a conductor formed on the first dielectric, v) a second dielectric formed on the conductor, and vi) a second ground shield formed on the second dielectric; wherein, for each microwave module, at least the second dielectric and second ground shield are recessed from an end of the conductor terminating at or near a cut edge of the microwave module; wherein, for each microwave module, ***the first ground shield and the second ground shield contact one another to surround the first dielectric and the second dielectric in a direction transverse to the conductor***, mounting the microwave modules adjacent one another, with said cut edge of the first microwave module facing said cut edge of the second microwave module; electrically coupling said ends of the conductors of the microwave modules; and ***placing a ground shield cap over the conductor coupling, and electrically coupling the ground shield cap to the second ground shield of each of the microwave modules***. Appellants assert neither Ishihara nor Arledge nor Cox provides any suggestion or motivation to one of ordinary skill in the art, without relying on hindsight, to select the above-identified features of independent claim 16. Claims 17 and 19 depend directly from independent claim 16, and are believed to be in condition for allowance at least the above-identified reasons.

4. Whether claims 3, 12 and 18 should be rejected under 35 U.S.C. 103(a) as being unpatentable over the rejection identified in Item 4 above as applied to claims 10 and 16, and further in view of Drapeau et al. (U.S. Patent No. 6,307,446; hereinafter "Drapeau").

Appellants believe Drapeau discloses an elastic interconnect between two conductors.

Claim 3

Appellants believe neither Ishihara nor Arledge nor Drapeau disclose or suggest **a microwave circuit having first and second microwave modules**, each of which comprises a conductor sandwiched between upper and lower thickfilm dielectrics, and **a ground shield surrounding the upper and lower thickfilm dielectrics in a direction transverse to the conductor**, wherein, at a first end of each of the conductors, the conductor extends from beneath its upper thickfilm dielectric to terminate at a cut edge of its microwave module; and **a ground shield cap**, oriented over the bridge conductor and **electrically coupled to the ground shield surrounding the upper and lower thickfilm dielectrics of each of the microwave modules**. Appellants assert neither Ishihara nor Arledge nor Drapeau provides any suggestion or motivation to one of ordinary skill in the art, without relying on hindsight, to select the above-identified features of independent claim 1. Claim 3 depends directly from independent claim 1, and is believed to be allowable for at least the above-identified reasons.

Claim 12

Appellants believe neither Ishihara nor Arledge nor Drapeau disclose or suggest **a method for coupling first and second microwave modules**, wherein each microwave module comprises: i) a substrate, ii) a first ground

shield formed on the substrate, iii) a first dielectric formed on the first ground shield, iv) a conductor formed on the first dielectric, v) a second dielectric formed on the conductor, and vi) a second ground shield formed on the second dielectric; and wherein, for each microwave module, at least the second dielectric and second ground shield are recessed from a first end of the conductor; wherein, for each microwave module, ***the first ground shield and the second ground shield contact one another to surround the first dielectric and the second dielectric in a direction transverse to the conductor***, the method comprising: for each of the microwave modules, cutting the microwave module in proximity to the first end of the conductor, thereby defining a first edge of the corresponding microwave module; mounting the microwave modules adjacent one another, with their first edges facing each other; electrically coupling said first ends of the conductors of the microwave modules; and ***placing a ground shield cap over the conductor coupling, and electrically coupling the ground shield cap to the second ground shield of each of the microwave modules***. Appellants assert neither Ishihara nor Arledge nor Drapeau provides any suggestion or motivation to one of ordinary skill in the art, without relying on hindsight, to select the above-identified features of independent claim 10. Claim 12 depends directly from independent claim 10, and is believed to be allowable for at least the above-identified reasons.

Claim 18

Appellants believe neither Ishihara nor Arledge nor Drapeau disclose or suggest ***a method comprising selecting first and second microwave modules***, each comprising: i) a substrate, ii) a first ground shield formed on the substrate, iii) a first dielectric formed on the first ground shield, iv) a conductor formed on the first dielectric, v) a second dielectric formed on the conductor, and vi) a second ground shield formed on the second dielectric; wherein, for each microwave module, at least the second dielectric and second ground shield are

recessed from an end of the conductor terminating at or near a cut edge of the microwave module; wherein, for each microwave module, ***the first ground shield and the second ground shield contact one another to surround the first dielectric and the second dielectric in a direction transverse to the conductor***, mounting the microwave modules adjacent one another, with said cut edge of the first microwave module facing said cut edge of the second microwave module; electrically coupling said ends of the conductors of the microwave modules; and ***placing a ground shield cap over the conductor coupling, and electrically coupling the ground shield cap to the second ground shield of each of the microwave modules***. Appellants assert neither Ishihara nor Arledge nor Drapeau provides any suggestion or motivation to one of ordinary skill in the art, without relying on hindsight, to select the above-identified features of independent claim 16. Claim 18 depends directly from independent claim 16, and is believed to be allowable at least the above-identified reasons.

5. **Whether claims 5-8, 14, 15, 20 and 21 should be rejected under 35 U.S.C. 103(a) as being unpatentable over the rejection identified in Item 4 above as applied to claims 10 and 16, and further in view of Dove et al. (U.S. Patent No. 6,457,979; hereinafter "Dove").**

Appellants believe Dove discloses a cover secured in place by solder or conductive adhesive where the cover touches the ground layer at the top of the quasi-coaxial transmission line.

Claims 5-8

Appellants believe neither Ishihara nor Arledge nor Dove '979 disclose or suggest ***a microwave circuit having first and second microwave modules***, each of which comprises a conductor sandwiched between upper and lower thickfilm dielectrics, and ***a ground shield surrounding the upper and lower***

thickfilm dielectrics in a direction transverse to the conductor, wherein, at a first end of each of the conductors, the conductor extends from beneath its upper thickfilm dielectric to terminate at a cut edge of its microwave module; and ***a ground shield cap***, oriented over the bridge conductor and ***electrically coupled to the ground shield surrounding the upper and lower thickfilm dielectrics of each of the microwave modules***. Appellants assert neither Ishihara nor Arledge nor Dove '979 provides any suggestion or motivation to one of ordinary skill in the art, without relying on hindsight, to select the above-identified features of independent claim 1. Claims 5-8 depend directly from independent claim 1, and are believed to be allowable for at least the above-identified reasons.

Claims 14 and 15

Appellants believe neither Ishihara nor Arledge nor Dove '979 disclose or suggest ***a method for coupling first and second microwave modules***, wherein each microwave module comprises: i) a substrate, ii) a first ground shield formed on the substrate, iii) a first dielectric formed on the first ground shield, iv) a conductor formed on the first dielectric, v) a second dielectric formed on the conductor, and vi) a second ground shield formed on the second dielectric; and wherein, for each microwave module, at least the second dielectric and second ground shield are recessed from a first end of the conductor; wherein, for each microwave module, ***the first ground shield and the second ground shield contact one another to surround the first dielectric and the second dielectric in a direction transverse to the conductor***, the method comprising: for each of the microwave modules, cutting the microwave module in proximity to the first end of the conductor, thereby defining a first edge of the corresponding microwave module; mounting the microwave modules adjacent one another, with their first edges facing each other; electrically coupling said first ends of the conductors of the microwave modules; and ***placing a ground shield cap over the conductor coupling, and electrically coupling the ground***

shield cap to the second ground shield of each of the microwave modules.

Appellants assert neither Ishihara nor Arledge nor Dove '979 provides any suggestion or motivation to one of ordinary skill in the art, without relying on hindsight, to select the above-identified features of independent claim 10. Claims 14 and 15 depend directly from independent claim 10, and are believed to be allowable for at least the above-identified reasons.

Claims 20 and 21

Appellants believe neither Ishihara nor Arledge nor Dove '979 disclose or suggest ***a method comprising selecting first and second microwave modules***, each comprising: i) a substrate, ii) a first ground shield formed on the substrate, iii) a first dielectric formed on the first ground shield, iv) a conductor formed on the first dielectric, v) a second dielectric formed on the conductor, and vi) a second ground shield formed on the second dielectric; wherein, for each microwave module, at least the second dielectric and second ground shield are recessed from an end of the conductor terminating at or near a cut edge of the microwave module; wherein, for each microwave module, ***the first ground shield and the second ground shield contact one another to surround the first dielectric and the second dielectric in a direction transverse to the conductor***, mounting the microwave modules adjacent one another, with said cut edge of the first microwave module facing said cut edge of the second microwave module; electrically coupling said ends of the conductors of the microwave modules; and ***placing a ground shield cap over the conductor coupling, and electrically coupling the ground shield cap to the second ground shield of each of the microwave modules.*** Appellants assert neither Ishihara nor Arledge nor Dove '979 provides any suggestion or motivation to one of ordinary skill in the art, without relying on hindsight, to select the above-identified features of independent claim 16. Claims 20 and 21 depend directly

from independent claim 16, and these claims are believed to be allowable for at least the above-identified reasons.

6. Conclusion

In summary, the art of record does not teach nor suggest the subject matter of Appellants' claims 1-25. These claims are therefore believed to be allowable.

Respectfully submitted,
DAHL & OSTERLOTH, L.L.P.


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Claims Appendix

Claim 1: A microwave circuit, comprising:

first and second microwave modules, each of which comprises a conductor sandwiched between upper and lower thickfilm dielectrics, and a ground shield surrounding the upper and lower thickfilm dielectrics in a direction transverse to the conductor; wherein, at a first end of each of the conductors, the conductor extends from beneath a respective upper thickfilm dielectric to terminate at a cut edge of a corresponding microwave module; the microwave modules being mounted with said cut edges facing one another;

a bridge conductor, electrically coupling the first ends of the conductors;
and

a ground shield cap, oriented over the bridge conductor and electrically coupled to the ground shield surrounding the upper and lower thickfilm dielectrics of each of the microwave modules.

Claim 2: The microwave circuit of claim 1, wherein the bridge conductor comprises a ribbon bond.

Claim 3: The microwave circuit of claim 1, wherein the bridge conductor comprises a mesh bond.

Claim 4: The microwave circuit of claim 1, wherein the bridge conductor comprises a plurality of wire bonds.

Claim 5: The microwave circuit of claim 1, wherein the ground shield cap is electrically coupled to the ground shield of each of the microwave modules via solder.

Claim 6: The microwave circuit of claim 1, wherein the ground shield cap is electrically coupled to the ~~second~~ ground shield of each of the microwave modules via conductive epoxy.

Claim 7: The microwave circuit of claim 1, wherein each of the microwave modules comprises a ceramic substrate.

Claim 8: The microwave circuit of claim 1, wherein the upper and lower thickfilm dielectrics of each of the microwave modules ~~module~~ comprise a KQ dielectric.

Claim 9: A microwave circuit, comprising:

first and second microwave modules, each comprising: i) a substrate, ii) a first ground shield formed on the substrate, iii) a first dielectric formed on the first ground shield, iv) a conductor formed on the first dielectric, v) a second dielectric formed on the conductor, and vi) a second ground shield formed on the second dielectric; wherein, for each microwave module, at least the second dielectric and second ground shield are recessed from an end of the conductor terminating at or near a cut edge of the corresponding microwave module; wherein, for each microwave module, the first ground shield and the second ground shield contact one another to surround the first dielectric and the second dielectric in a direction transverse to the conductor; the microwave modules being mounted with said cut edges facing one another;

a bridge conductor, electrically coupling said ends of the conductors of the microwave modules; and

a ground shield cap, oriented over the bridge conductor and electrically coupled to the second ground shield of each of the microwave modules.

Claim 10: A method for coupling first and second microwave modules, wherein each microwave module comprises: i) a substrate, ii) a first ground shield formed on the substrate, iii) a first dielectric formed on the first ground

shield, iv) a conductor formed on the first dielectric, v) a second dielectric formed on the conductor, and vi) a second ground shield formed on the second dielectric; and wherein, for each microwave module, at least the second dielectric and second ground shield are recessed from a first end of the conductor; wherein, for each microwave module, the first ground shield and the second ground shield contact one another to surround the first dielectric and the second dielectric in a direction transverse to the conductor; the method comprising:

for each of the microwave modules, cutting the microwave module in proximity to the first end of the conductor, thereby defining a first edge of the corresponding microwave module;

mounting the microwave modules adjacent one another, with their first edges facing each other;

electrically coupling said first ends of the conductors of the microwave modules; and

placing a ground shield cap over the conductor coupling, and electrically coupling the ground shield cap to the second ground shield of each of the microwave modules.

Claim 11: The method of claim 10 wherein electrically coupling said first ends of the conductors of the microwave modules comprises placement of a ribbon bond.

Claim 12: The method of claim 10, wherein electrically coupling said first ends of the conductors of the microwave modules comprises placement of a mesh bond.

Claim 13: The method of claim 10, wherein electrically coupling said first ends of the conductors of the microwave modules comprises placement of a plurality of wire bonds.

Claim 14: The method of claim 10, wherein electrically coupling the ground shield cap to the second ground shield of each of the microwave modules comprises placement of solder.

Claim 15: The method of claim 10, wherein electrically coupling the ground shield cap to the second ground shield of each of the microwave modules comprises placement of conductive epoxy.

Claim 16: A method, comprising:

selecting first and second microwave modules, each comprising: i) a substrate, ii) a first ground shield formed on the substrate, iii) a first dielectric formed on the first ground shield, iv) a conductor formed on the first dielectric, v) a second dielectric formed on the conductor, and vi) a second ground shield formed on the second dielectric; wherein, for each microwave module, at least the second dielectric and second ground shield are recessed from an end of the conductor terminating at or near a cut edge of the microwave module; wherein, for each microwave module, the first ground shield and the second ground shield contact one another to surround the first dielectric and the second dielectric in a direction transverse to the conductor;

mounting the microwave modules adjacent one another, with said cut edge of the first microwave module facing said cut edge of the second microwave module;

electrically coupling said ends of the conductors of the microwave modules; and

placing a ground shield cap over the conductor coupling, and electrically coupling the ground shield cap to the second ground shield of each of the microwave modules.

Claim 17: The method of claim 16, wherein electrically coupling the ends of the conductors of the microwave modules comprises placement of a ribbon bond.

Claim 18: The method of claim 16, wherein electrically coupling the ends of the conductors of the microwave modules comprises placement of a mesh bond.

Claim 19: The method of claim 16, wherein electrically coupling the ends of the conductors of the microwave modules comprises placement of a plurality of wire bonds.

Claim 20: The method of claim 16, wherein electrically coupling the ground shield cap to the second ground shield of each of the microwave modules comprises placement of solder.

Claim 21: The method of claim 16, wherein electrically coupling the ground shield cap to the second ground shield of each of the microwave modules comprises placement of conductive epoxy.

Claim 22: The microwave circuit of claim 1, wherein the ground shield cap has a top portion and at least one side portion extending away from the top portion, and wherein the ground shield cap forms a void between the top portion thereof, the at least one side portion thereof and the first and second microwave modules when the ground shield cap is electrically coupled to the ground shield surrounding the upper and lower thickfilm dielectrics of each of the microwave modules.

Claim 23: The microwave circuit of claim 9, wherein the ground shield cap has a top portion and at least one side portion extending away from the top portion, and wherein the ground shield cap forms a void between the top portion thereof, the at least one side portion thereof and the first and second microwave modules when the ground shield cap is electrically coupled to the second ground shield of each of the microwave modules.

Claim 24: The method of claim 10, wherein placing the ground shield cap over the conductor coupling, and electrically coupling the ground shield cap to the second ground shield of each of the microwave modules further comprises forming a void between a top portion of the ground shield cap, at least one side portion of the ground shield cap and the first and second modules.

Claim 25: The method of claim 16, wherein placing the ground shield cap over the conductor coupling, and electrically coupling the ground shield cap to the second ground shield of each of the microwave modules further comprises forming a void between a top portion of the ground shield cap, at least one side portion of the ground shield cap and the first and second modules.

Evidence Appendix

No extrinsic evidence was relied upon to support the arguments herein.

Related Proceedings Appendix

Appellants are unaware of any Board or court proceedings related to this Application.